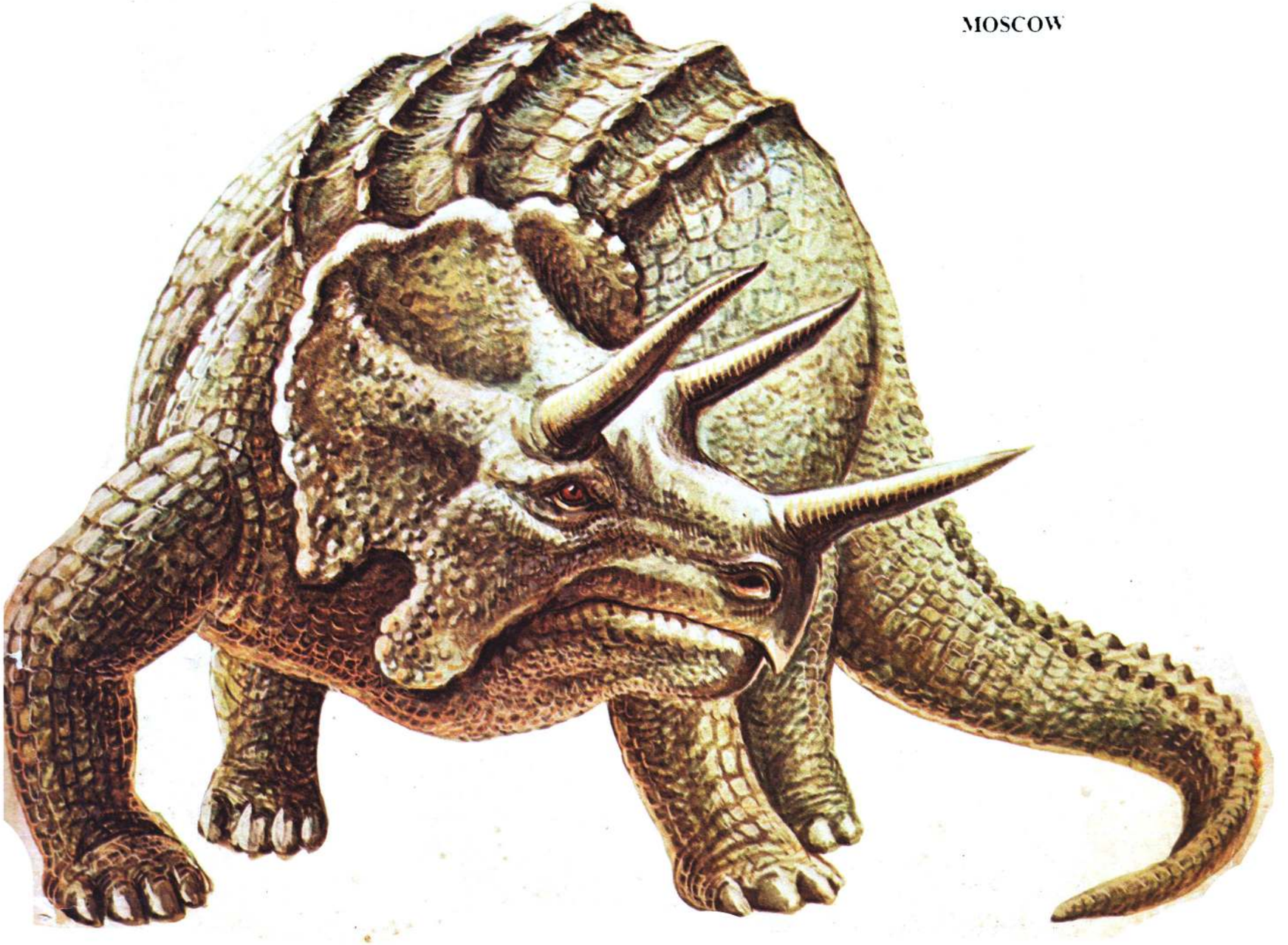
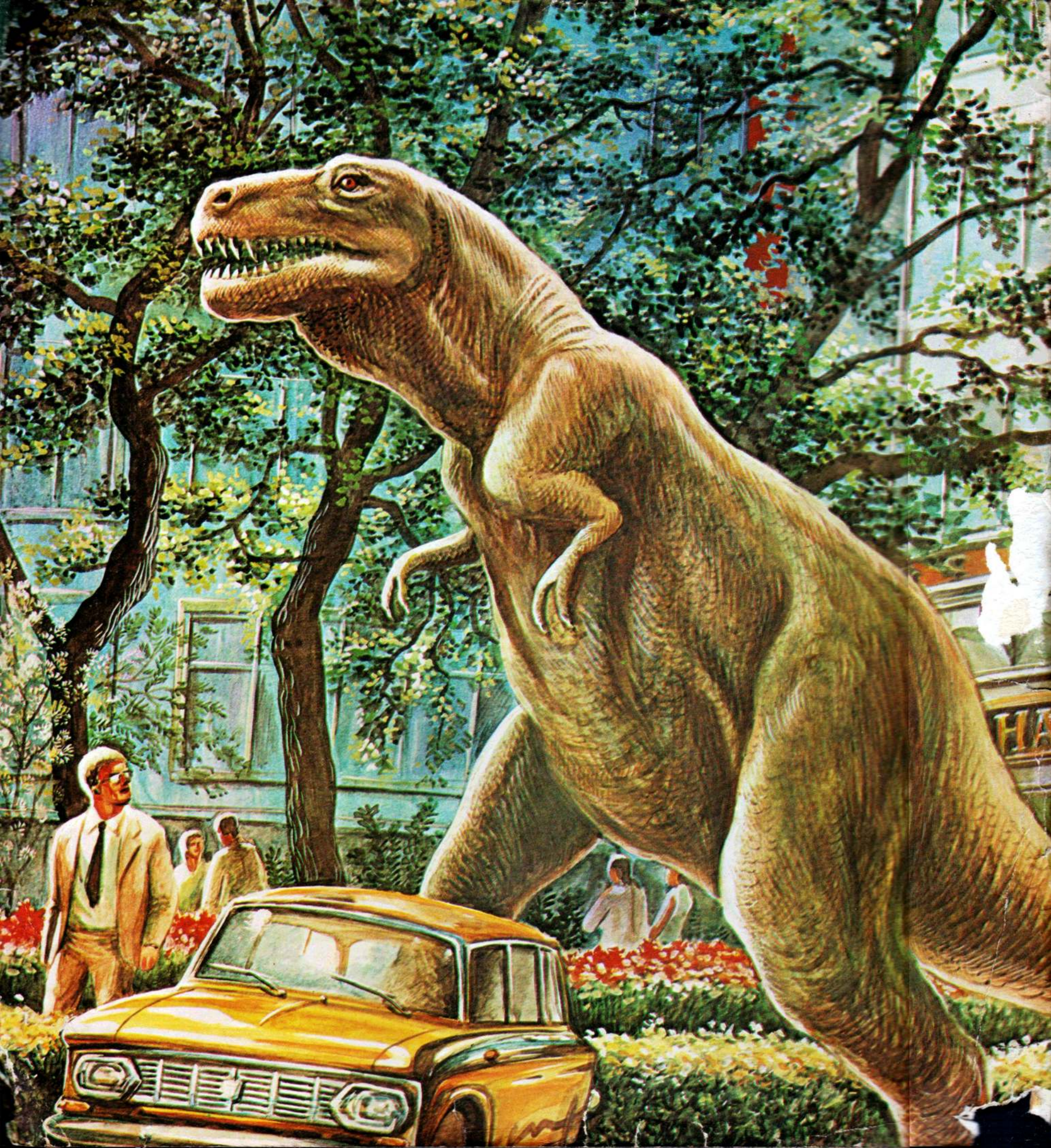
IRINA YAKOVLEVA

PALEONTOLOGY PICTURE BOOK

RADUGA PUBLISHERS
MOSCOW





IRINA YAKOVLEVA

PALEONTOLOGY PICTURE BOOK

Translated from the Russian by SERGEI SOSINSKY

Drawings by RUBEN VARSHAMOV

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MOSCOW

Petrified leaves of an ancient forest

PALEONTOLOGY: A SCIENCE ABOUT ANCIENT ANIMALS

The folk tales of different nations are filled with wondrous creatures: terrible flying dragons, sea serpents, giant birds which can carry away an elephant like a kitten. Such monsters are not to be found in our forests, nor in distant lands or deep seas. Then, should we believe folk tales? Scientists say that we should. They know that creatures similar to the ones in folk tales lived on earth, only very long ago, when man did not exist yet.

WHAT WOULD HAPPEN IF THEY LIVED TODAY?

Imagine what would happen if these ancient giants were to come out into the streets of a modern city. Looking like sinister tanks, mighty cranes and enormous gliders, these fabled monsters would stop traffic in the city, turn buses upside down, tear electric wires and trample all the parks. Actually, of course, this would never happen because the ancient animals died out millions of years ago, and we know about them only from the "chronicle in rock".

The warm sea has dried up a long time ago, but the fish seems to be swimming through the stone

WHAT IS THE CHRONICLE IN ROCK?

The chronicle in rock is the earth itself. The pages of the chronicle are layers of sand and clay such as can clearly be seen on a steep bank of a river or in a ditch dug in the street to lay gas mains. The deeper the layers, the older they are. The least ancient ones tell about man's history.

In the old central parts of cities cobblestones lie right under the concrete streets, still deeper are wooden streets. In these layers one may find a rusty sword and an ancient coin.

Below these, pages of the chronicle in rock begin, because the sand has turned into hard sandstone, and mud and clay into platy stone. There are no traces of man here. Nevertheless these pages are as interesting as the pages of fairy-tales.

WHERE CAN YOU SEE A STONE PAGE?

The chronicle in rock is incredibly thick. Dozens of kilometres separate the upper pages from the lower ones. The pages themselves are very heavy. Man is not strong enough to turn these pages, but nature helps him. The rock layers are rumpled and turned upside down in the mountains and foothills. The water and the wind dig deep gorges in them, revealing the oldest pages. It was in these places that people once saw the giant bones, after which they invented tales of dragons and giants.

WHAT DOES THE CHRONICLE IN ROCK TELL ABOUT?

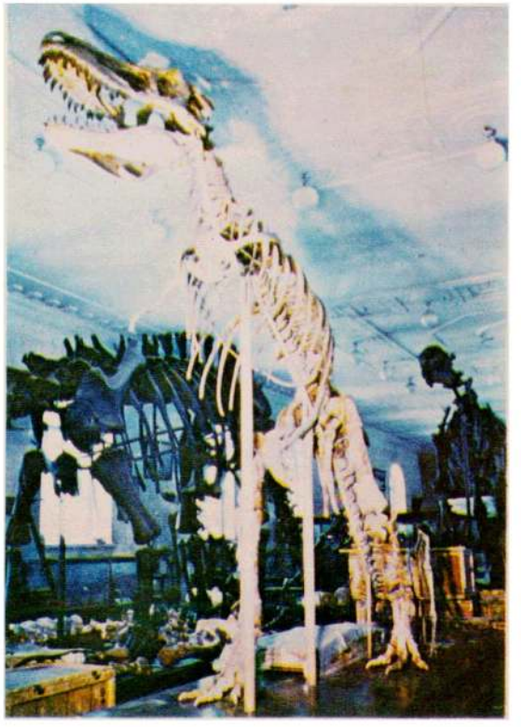
An intricately patterned fern seems to be drawn on a smooth hard stone. But try to erase the drawing. It won't come off. This is a petrified fern from an ancient forest. A beetle has spread out its wings nearby. It is also petrified. Once, it had crawled on the fern.

Take a yellowish transparent piece of amber. It is the petrified resin of an ancient tree. Look at the mosquito in the amber. It had been caught in the ancient resin many millions of years ago.

Here are traces on a boulder. They resemble the footmarks left by a crow or chicken. Only the traces are larger than an elephant's. It is several metres from one trace to the next. Who roamed here in ancient times?

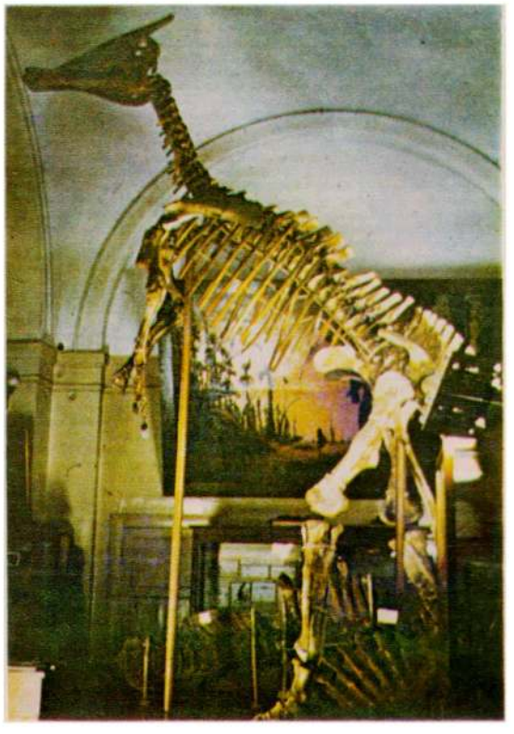
Once upon a time, the wasp decided to rest on a drop of resin. It has rested for millions of years in the transparent amber

There is hardly enough room for the giant reptiles in the big hall



The flesh-eating reptile's teeth showed no mercy. The teeth look frightening even behind glass

This dragon was brought from the Gobi desert



A starfish is flattened against a white limestone, sea urchins are curled up and a school of little fish seem to be swimming through some sea lilies. This is the petrified sea bottom.

There are frightening pictures in the chronicle. All of a sudden, razor-sharp teeth on the skull of a reptile dragon shine out at us from the stone or the long princers of a fabled scorpion stretch out at us like rakes.

And whose gigantic bones are these? Perhaps they belong to a one-eyed giant?

WHO READS THE CHRONICLE IN ROCK?

The chronicle in rock is read by scientists called paleontologists. In summer, they go on far-away expeditions, to the mountains and deserts, to the places where the ancient pages have come out on the earth's surface. Sometimes, it is very difficult to read the chronicle in rock. Usually, the sun, wind and rain have worked on the open page before the paleontologists. The stone page has cracked. The bones of animals have become mixed up. The imprints of ancient shells, insects and plants have been swept far away. Scientists have to work a great deal to read such a page.

A paleontologist can sometimes determine the animal from just one bone, because he knows how different animals are built. A paleontologist puts all the bones he finds in their places and says exactly how the animal which was never seen before looked. He also learns where the animal lived and what it could do.

WHAT IS PALEONTOLOGY NEEDED FOR?

Fabled animals often helped heroes of fairy-tales find the way to a treasuretrove or magic water. The animals in the chronicle in rock also show the way to

underground wealth. The pages seem all the same to those who don't know how to read the chronicle. Try and guess where to find the treasures people need!

After examining the petrified leaves and shells, the paleontologist will say: "We must look here!" Because some fossils are found only in layers with coal, and others in oil-bearing strata.

The most important thing is that people always wanted to know what was before them. What was the earth like? What kind of animals roamed on the earth and what did they look like? The science of paleontology answers these questions.

Fossil "hunters" have opened another page in the chronicle in rock

ABOUT THE CHAPTERS IN THE CHRONICLE IN ROCK

Paleontologists have read four chapters in the chronicle in rock. The first, upper chapter tells about the age of Recent Life when the earth was inhabited by animals which fed their offsprings with milk. These animals resembled those living now.

The second chapter underneath the first told scientists about the age of Intermediate Life when giant reptiles were masters of the earth.

In the third chapter, lower down, paleontologists read about the age of Early Life when there were no birds or animals on earth but only enormous frogs, fish and sea scorpions.

From the fourth, lowest chapter, scientists learned about the age of Primordial Life when the earth was empty, and invisible creatures, little transparent beings lived in the seas.

In this book you will see animals, reptiles, birds and plants in the same order as they are found in the chronicle in rock. The animals resembling existing ones and living relatively recently are depicted in the beginning. The most ancient animals and plants—in the end.

They seem to have "caught" the ancient reptile

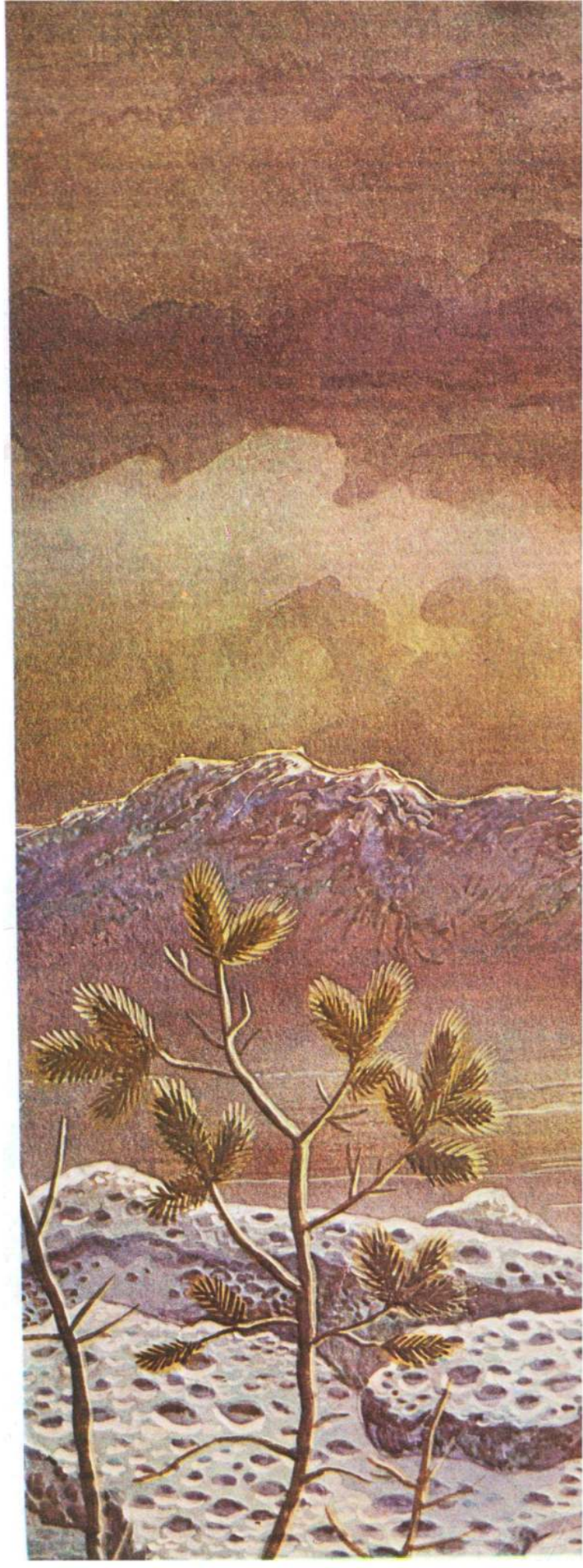
AFRICA IN A FUR COAT

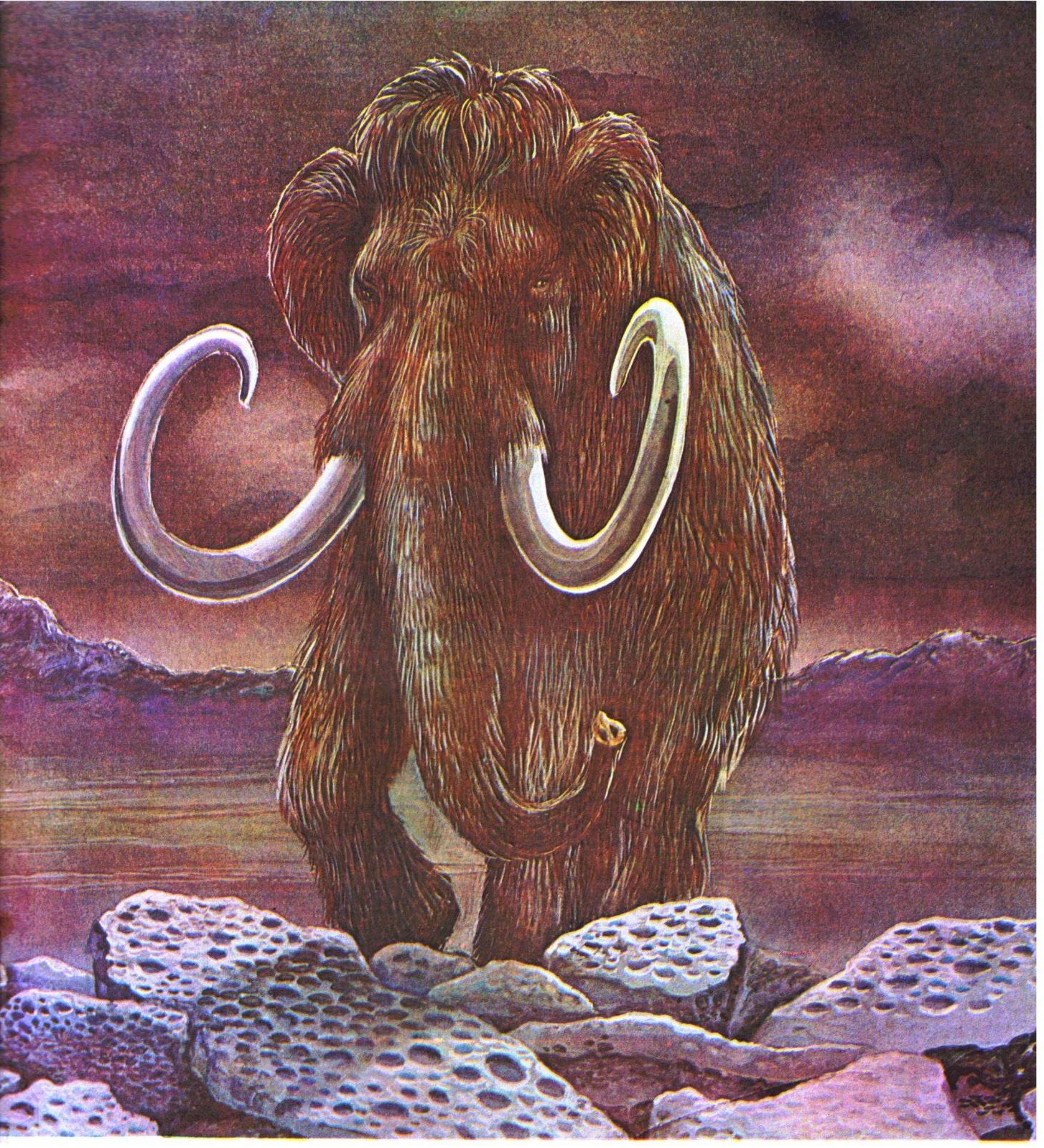
25,000 Years Ago

It's very cold. There's snow and ice all around. Mountains of ice are creeping through the Ukrainian steppes from the North to the Caucasus. The northern steppe lies in the places where there is no ice. Dwarfish fir and pine trees, stunted birch trees and heather cover the ground. Elephants and rhinoceroses walk among them just as in Africa. Only the animals are very hairy. Shreds of stiff red hair hang down to the ground. The hairy elephant is called a MAMMOTH. The mammoth digs under the snow with its tusks and eats last season's sedge and birch branches. It slowly chews the hard food. The mammoth only has four teeth but each is the size of a man's head. The ears are small. It does not need the elephant's fan-like ears: might get frost-bitten.

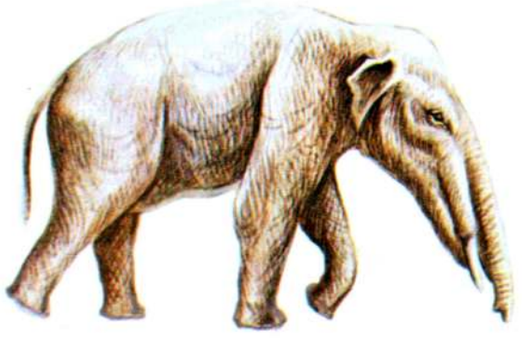
Not far off grazes a rhinoceros. It is also in a fur coat and is called the HAIRY RHINOCEROS for that reason.

The hairy giants are equalled by the ANTLERED DEER. The deer looks carefully around, protecting itself against the terrible CAVE LION. It's almost Africa here. Africa in a fur coat.

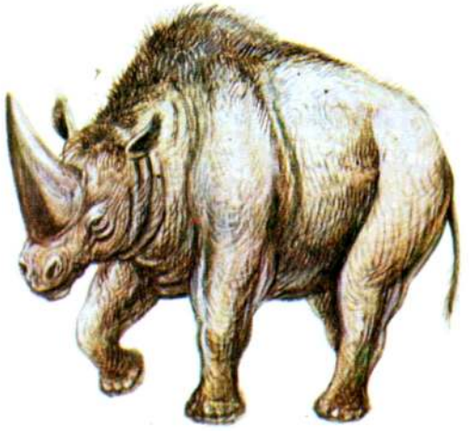




The Megalanthropus, neither ape nor man. It was very strong and feared no one



The Mastodon was a distant relative of the elephant. It liked to nibble at the grass and eat up shrubs



The ancient rhinoceros Elasmotherium was the size of an elephant

LAND WITHOUT ICE

50,000 Years Ago

Wondrous giants lived on the land where there was no ice, where it was warm and even hot. The most mysterious giant was the MEGALANTHROPUS. It was neither ape nor man. It walked on two legs and only slightly supported itself with its arms. It was twice as tall as the tallest man and largest ape.

The MASTODON, a relative of the elephant, and the ELASMOTHERIUM, a relative of the rhinoceros, were mighty beasts. The Elasmotherium had only one horn, and not on the nose but on the forehead. Such an animal would dig its enormous trunks of feet into the ground, break loose the roots of plants like a bulldozer and eat them crunching loudly.

A giant sloth, the MEGATHERIUM, lived in America's tropical forests in those times. Sloths still live there today, but very small ones. They are like monkeys hanging on a branch whole days on end until they've eaten all the leaves. Even then the sloth is in no hurry. It is so lazy nothing can make it move away, neither hunger nor enemies. The giant sloth was even lazier. It didn't even climb on a branch. It would tear down a tree with its paws and eat it leisurely.

Next to it lived the GLYPTODON, the largest armoured animal in the world. It was like a hedgehog, only bigger than a man. Instead of spines, it had bony plates as thick as a finger on its back. Try and get at this animal when it is curled up into an armoured ball!

The Palaeotragus was a relative of the giraffe

The ancient giant elephant, the Dinotherium, had tusks just like a walrus

BEFORE THE ICE CAME

1,000,000 Years Ago

Before the ice came, it was very warm on the whole earth. Merry beech tree forests grew in the places where there is taiga today. Birds sang, cicadas chirped and a curious animal lived here, neither horse nor giraffe. This animal had a horse's neck, and horns on its head. The ears were like an ass's and the legs were striped like a zebra's.

This was the PALAEOTRAGUS, a distant relative of the modern giraffe. Everyone knows that giraffes live in Africa. But the Palaeotragus lived in the European steppes.

This relative of the elephant, the DINOTHERIUM, has stopped near a river. Dinotherium means wild beast. But there is nothing really so wild about it. An elephant like any other. Only bigger and the tusks are pointed downwards like a walrus's.

The terror of the ancient animals, the SABER-TOOTHED CAT has pressed its prey to the ground. Its eyes are glowing, the fur bristles, the little ears are pressed to its head and teeth bared in a snarl. Its teeth are merciless.

Finally, the animal has calmed down and is licking its chops. The teeth have disappeared in a sheaths of sorts. The saber-toothed cat needs these sheaths on its chin so its teeth would not become blunted in the thick undergrowth.

The ancient hog, the Enteledon, was the size of a bull, but seemed very small next to the Indricotherium

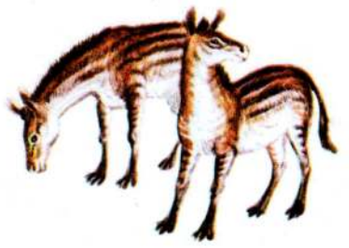
UNSIMILAR RELATIVES

30 Million Years Ago

Russian folk tales tell about an animal called an Indrik which was so large it dammed up rivers and moved mountains. That was why when scientists found the bones of the biggest rhinoceros in the ground, they called it INDRICOTHERIUM. A hippopotamus could pass freely under its belly. Though the Indricotherium is a rhinoceros, in appearance and habits it was a real giraffe. It walked among trees and gobbled up the leaves. Not at all like a rhinoceros!

The long-legged boar, the ENTELEDON, had the habits of a hippopotamus. It splashed in river backwaters all day, and roamed through the savanna at night. This hairy, tusked animal would eat everything it found: juicy rootstock, birds' eggs and snakes.

The water elephant also looked more like a hippopotamus than an elephant. The elephant would open its mouth resembling an excavator shovel, gulp in water plants and eat them. The flat tusks helped it deal with the roots. This elephant is called a PLATYBELODON, which means flat-toothed.



The ancient horse Eohippus was not larger than a fox. it had four toes on the front legs and three on the hind legs

The Andrewsarchus looked like a hyena and a bear at the same time

The grandfather of all hedgehogs, the Pseudichtops, had no spines and it did not know how to curl up into a ball yet

THE SHADOWS OF THE ANCIENT STEPPES

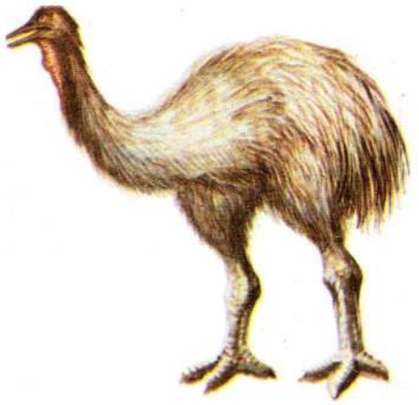
60 Million Years Ago

The steppe is thundering and roaring in the night. Strange-shaped shadows are rushing into the distance, breaking the fine moonlight. Is it an avalanche? Or an earthquake? Neither. Someone frightened a herd of thunderbolt animals, the BRONTOTHERIA.

A bellowing sound, and a hairy body flashes in the moonlight. The eyes burn eerily. The rows of teeth emit a frightening light in the incredibly enormous mouth. This is the terror of the night, the ANDREWSARCHUS out hunting.

A small rat-like animal scampers to the side and disappears. The grandfather of all hedgehogs, the PSEUDICHTOPS, leads a life of fear in the steppe at night. It has no spines yet.

When silence set in, spots of moonlight began to jump about. These are tiny, ancient horses the size of a fox, having fun. They are called EOHIPPI. Their little three-fingered cloven feet step noiselessly along the dew-covered grass. The pliant little tails with brushes on the end swing in the air. They will have to grow and learn how to run for a long time before they become real horses.



The Aepyornis bird could peep into a second-storey window. It lived 50,000 years ago

The Moa bird lived in the forests of Australia and New Zealand. People wiped it out 200 years ago

GIANT BIRDS

35 Million Years Ago

Thousands of different birds, large and small, inhabited the earth during the Recent Life. There were real giants among them, which looked most of all like ostriches. But next to any of these birds the ostrich would seem to be a dwarf. None of them could fly.

Eggs of the AEPYORNIS are still found in the peat bogs on Madagascar Island. The chick hatching from such an egg was the size of a hen. A full-grown Aepyornis could peep into a second-storey window. The Aepyornis and the MOA resembling it were peaceful birds and harmed no one.

THE HEADSMAN BIRD

The PHORORHACHOS bird could also reach a second-storey window. Its head was larger than a horse's. Its beak was like an axe. The blood-thirsty bird would stare at its prey with unblinking glass-like eyes and cut it into pieces. Then the dark vultures would arrive for the grisly feast. Another hunting bird, the DIATRYMA, would come running on its sinewy legs and start circling round the giant in hope of getting a tasty piece.

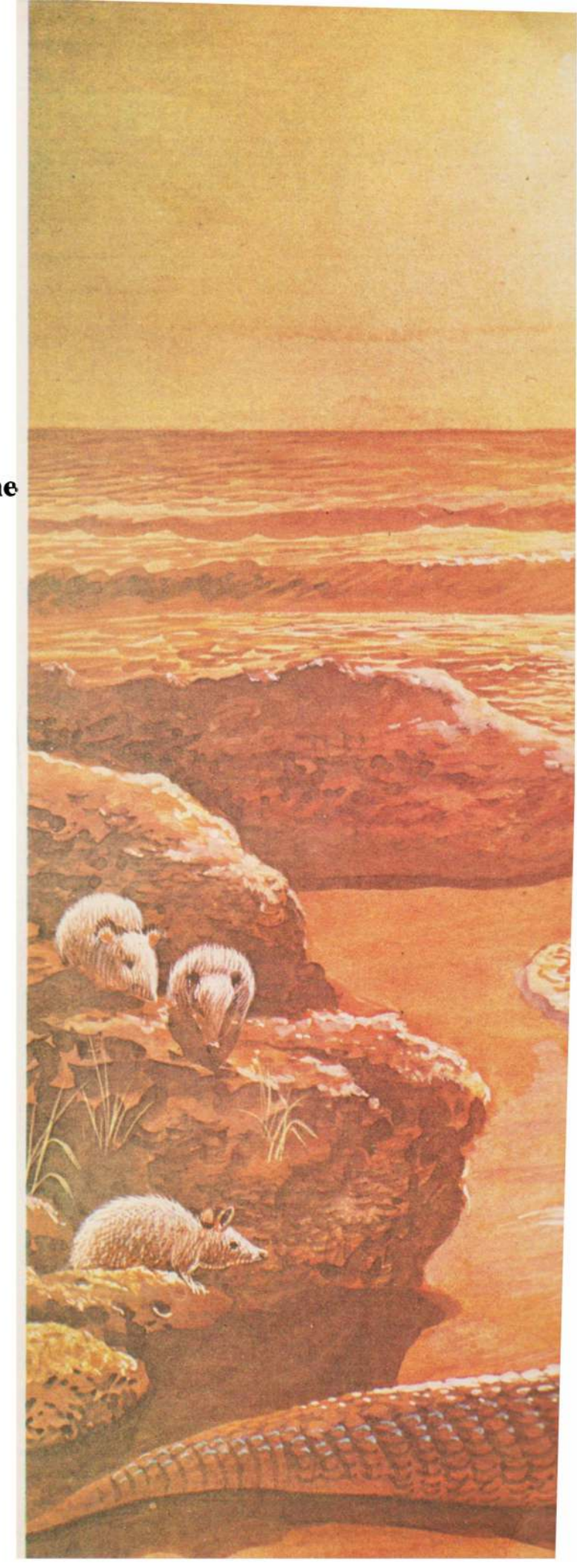
Isn't it difficult to imagine, looking at the Phororhachos, that this grim "headsman" is a relative of our gentle and graceful cranes.

BETWEEN THE PAST AND THE FUTURE

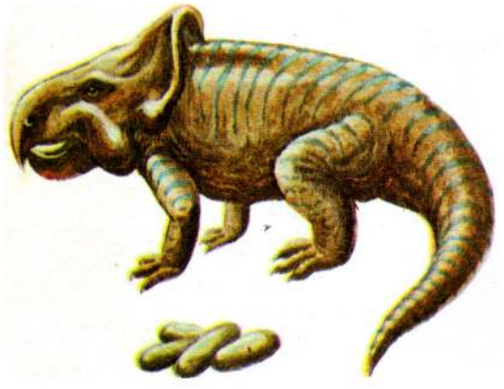
70 Million Years Ago

Quick little animals were rustling, puttering about and running from place to place. Their long noses were constantly twitching, and sharp teeth chewing anything they found. All of a sudden, the ears perked up, mouths stopped chewing, and eyes looked at one point. Another instant, and the animals disappeared. An ugly and clumsy giant stood on the place where the little animals had played just now. The sun set, and long, dark shadows ran over the ground. The rocks and stones on the shore of the lagoon became an ominous red colour. The red light was reflected in the giant's eyes. The enormous paws resembling the trunks of a dead tree came alive and began to move. An abrupt, haunting gurgling sound swept over the water and died down immediately, the transparent evening fell silent. No one answered and no one came. Only the quick little animals climbed out from under stones and began to run about as they had before. They took no notice of the lonely reptile which came here at sunset every day and waited in vain for an answer to its call. They had grown used to it, as they had to the rough stones and the odour of algae.

The giant also failed to notice the little animals. It had no way of knowing that its time had already passed and the great-grandfathers of the elephant, rhinoceros and whale were running under its feet and that the latter animals would become masters of the earth for many thousands of years.



The Triceratops reptile was the size of a bull. It was well armed and could stand up for itself. The skulls of these reptiles preserve traces of wounds received in ancient battles



The little Protoceratops was a great-grandfather of the horned Triceratops. Only a bony helmet saved it from the carnivores. As all Dinosaurs, it laid its eggs in shallow holes in the sand

INTERMEDIATE LIFE

70 to 140 Million Years Ago

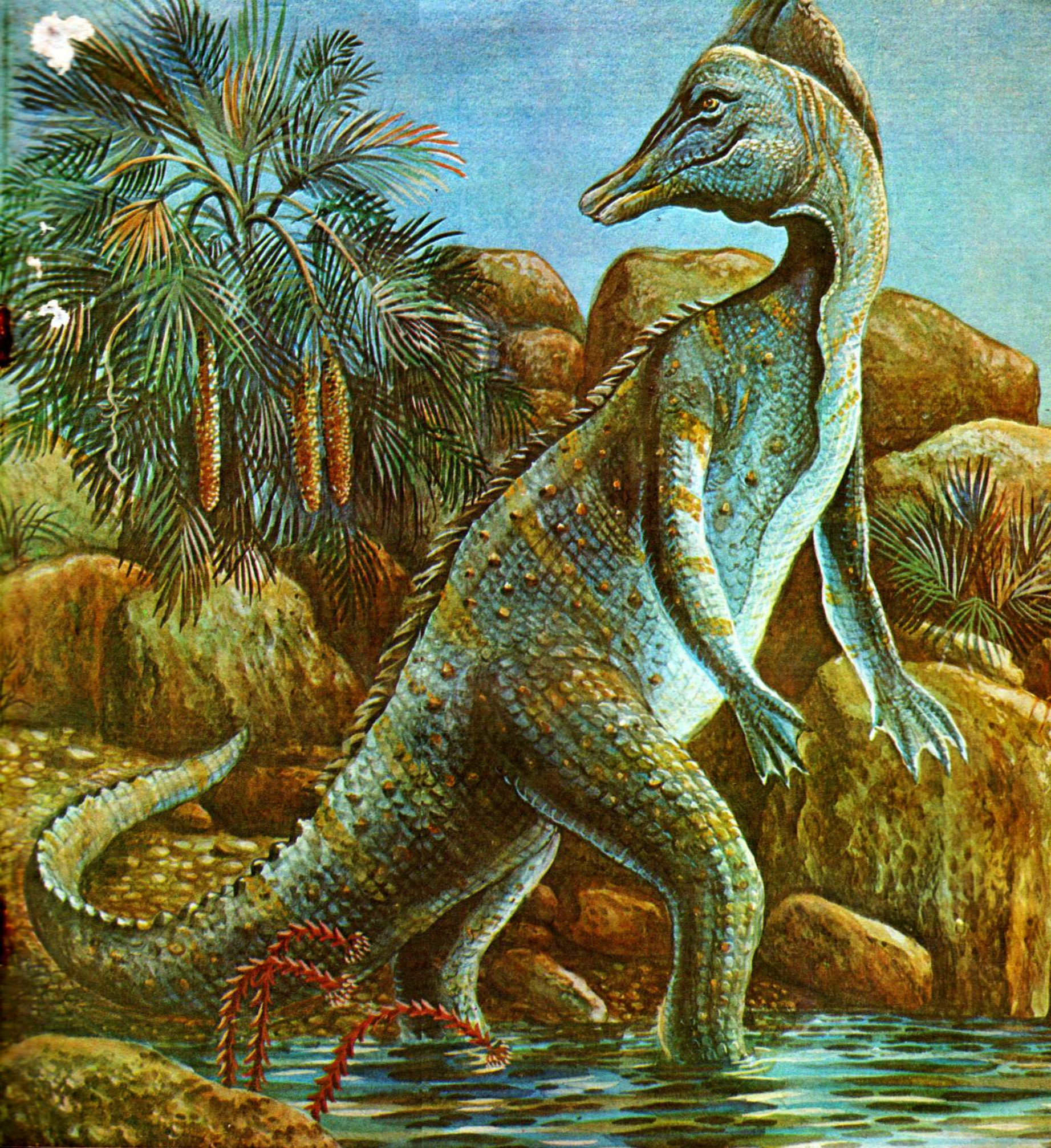
The earth would seem uncomfortable and frightening to man in those times. Flowers and grass did not grow on clearings, and butterflies did not flutter about over them. Strange, toothed birds did not sing and chirp but hissed and quacked. Enormous branches of tree-like ferns swayed high overhead. Wide leather-like leaves rustled on coniferous trees.

There were reptiles around. Only reptiles on land, in the sea and in the air. Large and small reptiles, peaceful and flesh-eating. Slow and fleet-footed, covered by bare skin and by hair. On two legs and on four. Reptiles with flippers instead of legs. The reptiles were the masters of the earth.

REPTILE DIVER

80 Million Years Ago

The duckbill reptile, the SÀUROLOPHUS, was a peaceful, herbivorous animal. It was not afraid of predators because it could always find refuge in the water. It was high as a two-storey building, and a tall comb on its head made it even higher. The reptile diver could swim very well and ate different water plants. It would pull at the stubborn roots underwater with its bill, while only the comb would be above water. The reptile diver would be in no hurry, it would not suffocate. Two tubes passed in the comb and opened right into the nose. The reptile breathed through them. Simple and convenient!



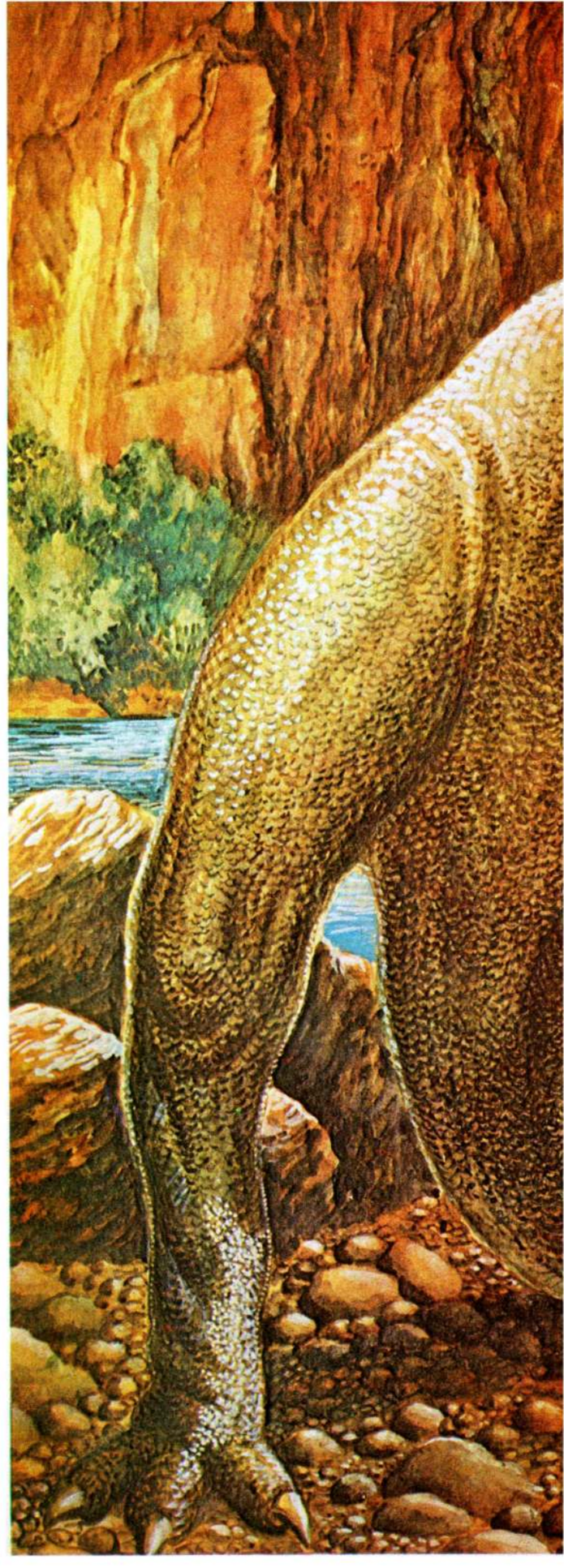
REPTILE TYRANT

80 Million Years Ago

The largest and strongest reptiles on earth were the DINOSAURS. This word means terrible, dreadful lizard. But the most terrible and bloodthirsty Dinosaurs were the TYRANNOSAURS, predatory reptiles.

The Tyrannosaur, a terrible dragon with little arms, rushed out into the clearing. The knife-like teeth shone and the long, fleshy tail beat the ground. The mighty claws left deep furrows in the ground. Hissing and cackling broke the hot air. The predatory reptile lept upon its prey.

But it was not as easy as that. Resembling an enormous cone, the ANKYLOSAUR stooped to the ground and bristled with its bony scales. The tail with a spiked club on the end bent, swished through the air and began to make rumbling deadly circles. The predator lept to the side, but the Ankylosaur turned its tail towards it again. Try and come close!



The Pycnodont fish chewed shells and was often eaten by sea reptiles and birds

Belemnites flashed over coral reefs like torpedoes

The Ammonite looks like a cuttlefish in a big snail shell the size of a truck wheel

BIRDS AND REPTILES

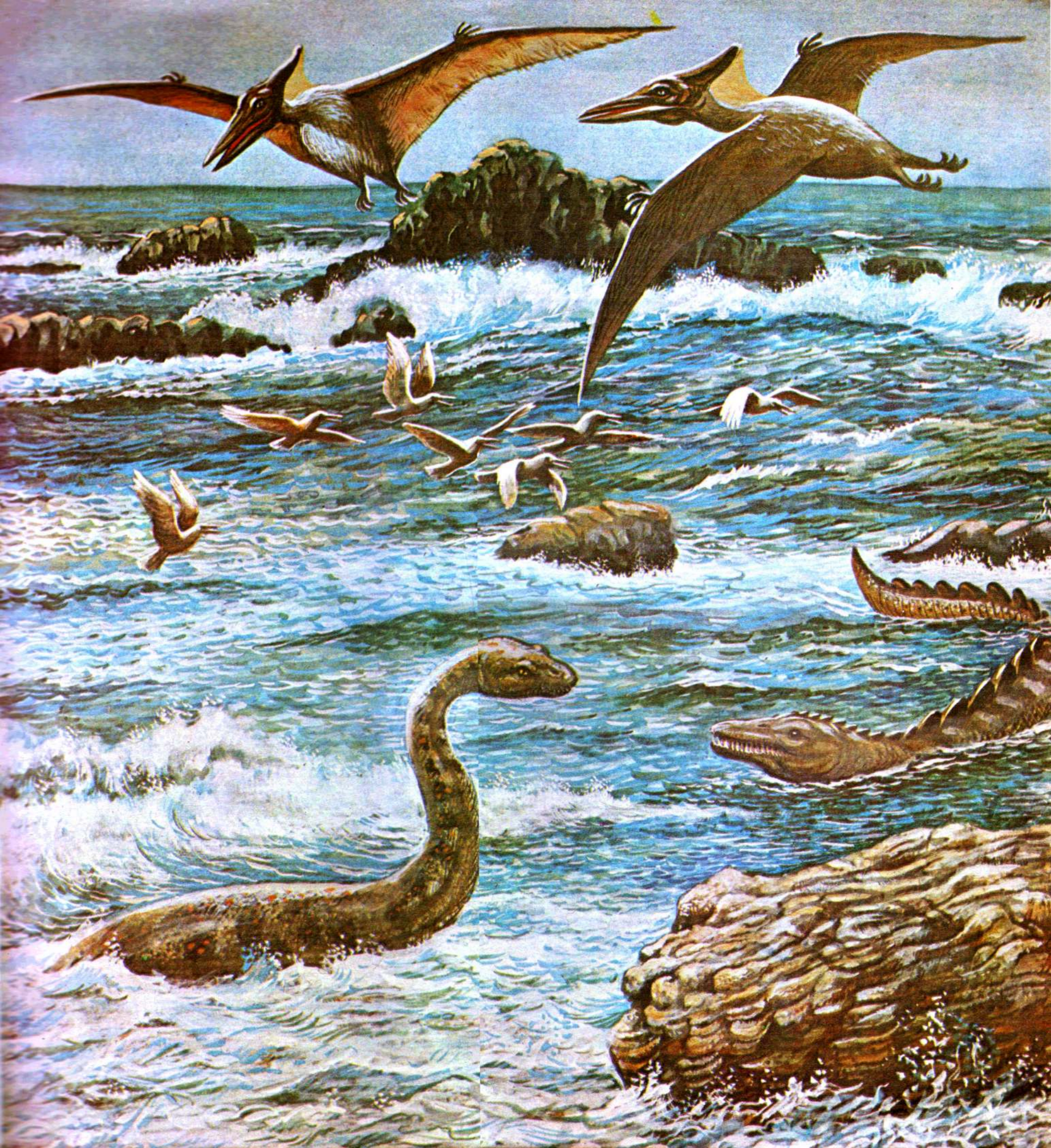
120 Million Years Ago

Hot vapours hung above the bay. There was not the slightest wind. But the sea was not still. The surf came rolling in from the ocean, green waves hissed on the pebbles and subsided on the hot coastal stones.

A long-shaped dark head appeared in the white foam of the surf. A large fish, the PYCNODONT, fluttered, held by sharp teeth. The water sighed and gently receded, taking coloured bubbles of foam along. The big, wingless bird rambled on its red webbed feet.

Making its way to the nest, to its distress, the clumsy hunter HESPERORNIS frightened a flock of toothed gulls, the ICHTHYORNISES. The air filled with hissing, quacking and jaws' snapping.

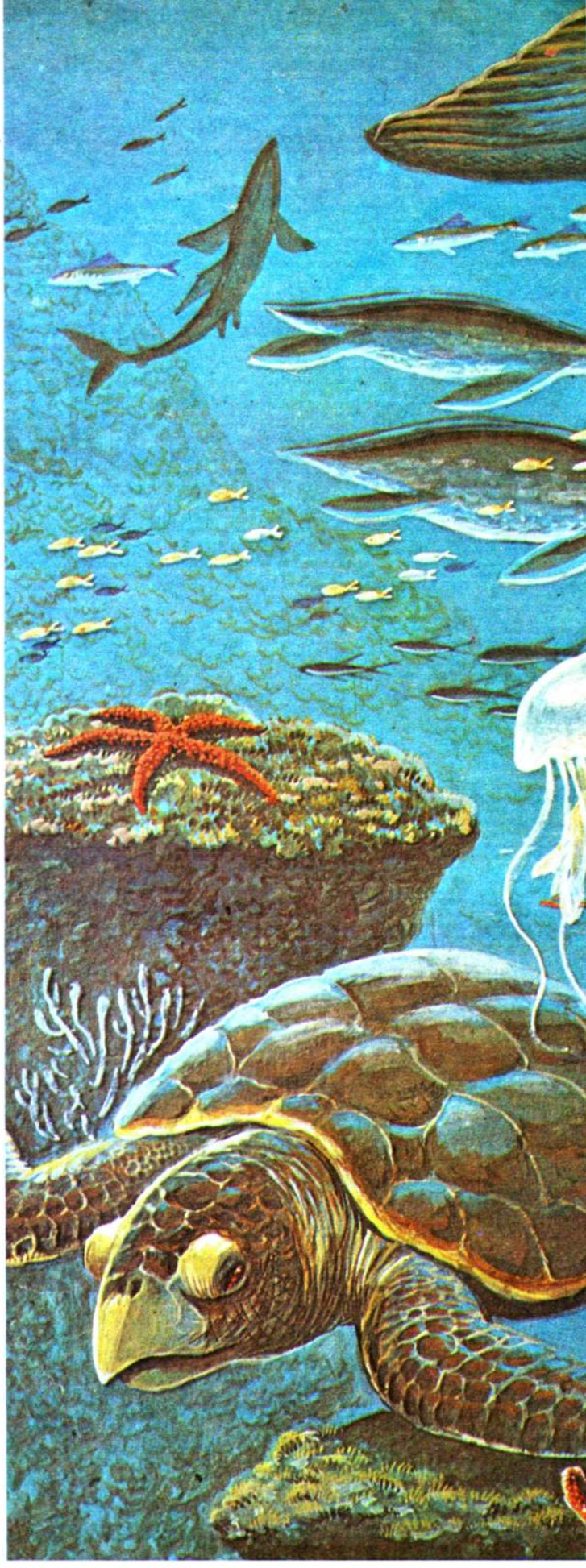
All of a sudden, a silent dark shadow seemed to press the noisy flock against the ground. Waving its wings majestically, the flying reptile PTERANODON, under whose webbed wing several elephants could easily fit, floated along in the sky. But the master of the sky did not look down. It was heading for the ocean. The serpent-like necks of sea reptiles PLESIOSAURS twisted in the hot mist. The reptiles were starting to hunt the BELEMNITES, large schools of which were entering the bay.



REPTILE PIRATE

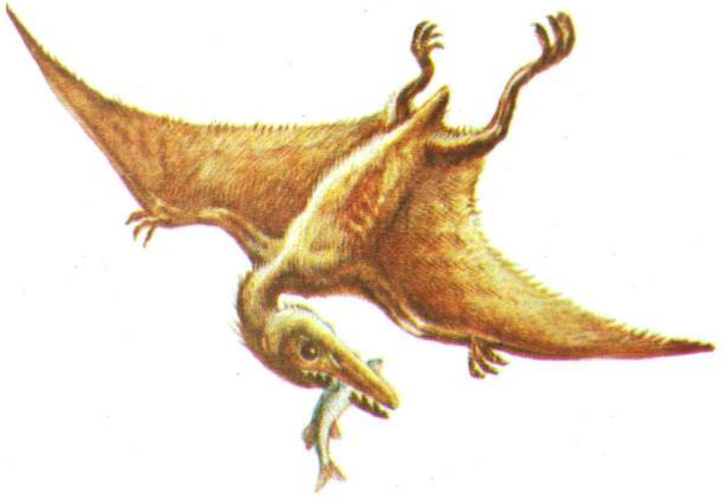
100 Million Years Ago

The big sea turtle ARCHELON was paddling desperately with its flippers. Its only desire was to escape and hide. Who would want to be shark's breakfast on such a brilliant, sunny day? The turtle went down to the very bottom passing over bright-coloured coral ridges, then up to the surface, pushing aside the jellyfish. But it was all in vain. The monstrous shark was approaching. Another instant and it would be all over. All of a sudden, a terrific whirlpool caught up the turtle and turned it furiously. An enormous body struck from above like a thunderbolt. Jaws resembling a cave opened and the shark disappeared instantly. Only the tail continued to beat the water in a frenzy. The unexpected rescuer of the turtle was a MOSASAUR sea reptile. The turtle was choking and, mustering its last strength, it made for the surface where dolphin-like reptile fish were playing. And just in time. The Mosasaur had finished off the shark and was looking for new prey among the corals.



The oldest bird on earth, the Archaeopteryx, could not fly very well, but climbed up trees and ran very nimbly

The hairy reptile Pterodactyl was no larger than a crow



The toothed reptile Rhamphorhynchus liked to taste fish but would also swallow a slow dragonfly

ANIMALS OF THE ANCIENT FOREST

170 Million Years Ago

The DIPLODOCUS was one of the largest reptiles on earth. If such a giant were to appear on Main Street in our days, it would block traffic from sidewalk to sidewalk. The Diplodocus wandered through the marshes whole days on end and ate without stopping. The small head on a long serpent-like neck stretched out either to the high tree tops or deep into the water. It was no easy matter to feed such an enormous body!

The STEGOSAURUS reptile also chewed all the time. But it failed to grow up as big as the Diplodocus. The Stegosaurus lived in the weeds near the water but did not like to swim. It could easily fall prey to a fierce predator. For that reason the Stegosaurus was compelled to arm itself. It had four needle-sharp spikes on its tail, and a double row of weird shaped bony plates were located on the back. The Stegosaurus would hiss terribly, the wing plates grating, and swing its lethal tail. Its enemy would falter, back away and disappear never to return. Hairy reptiles with webbed wings would come flying at the noise. But they could not cope with the Stegosaurus because they were no larger than a falcon. The laryngeal sounds and cackling of the reptiles aroused a bright-coloured bird resembling a Christmas tree decoration. It froze on a tree trunk with a black beetle in its toothed beak. The most ancient bird on earth, the ARCHAEOPTERYX was the size of a pigeon and tried to keep away from its dangerous neighbours.

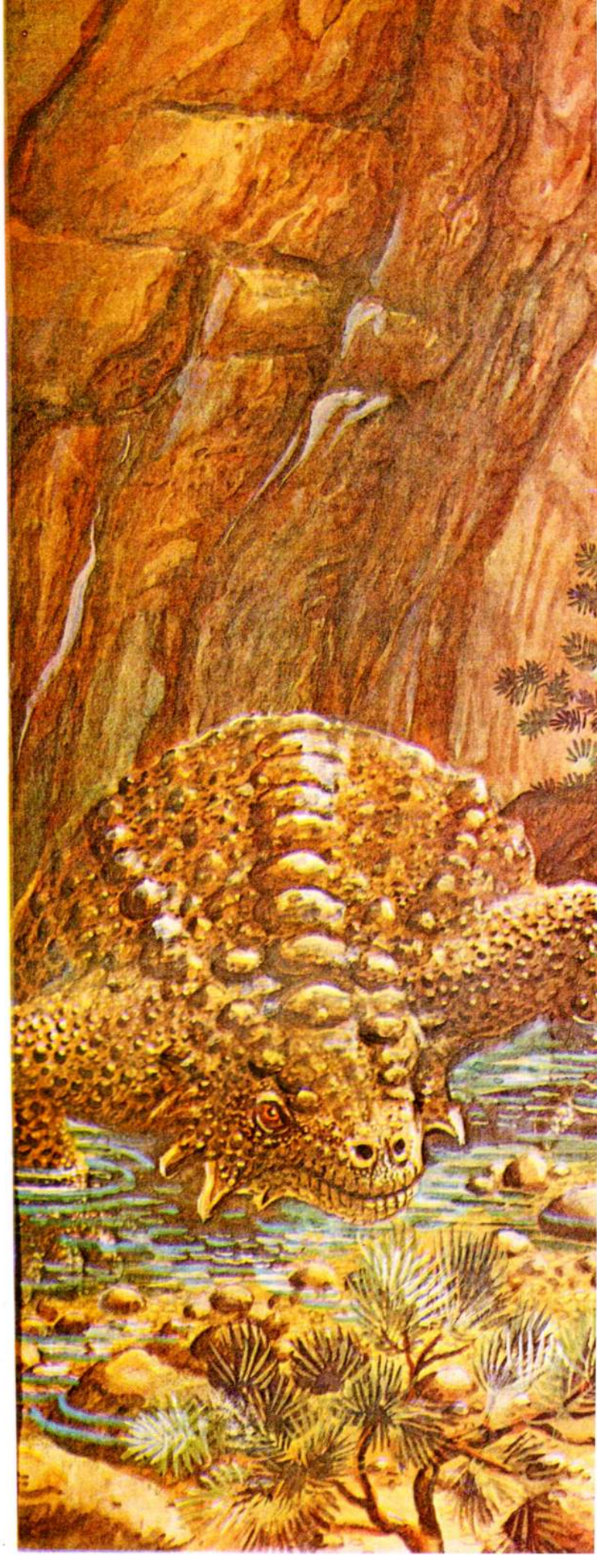
THE AGE OF EARLY LIFE

220 to 570 Million Years Ago

It was not always hot in those far-off times. It happened that enormous glaciers moved down from the South and North poles. Their cold breath reached the places where the ancient reptiles lived. That was why the EDAPHOSAURUS always carried a heating device with it. It had a high comb like a sail on its back held by bones. Whenever the sun would appear, the Edaphosaurus would prop up the comb in the sunlight. The comb would be warmed quickly, and the heat would pass through the reptile's body.

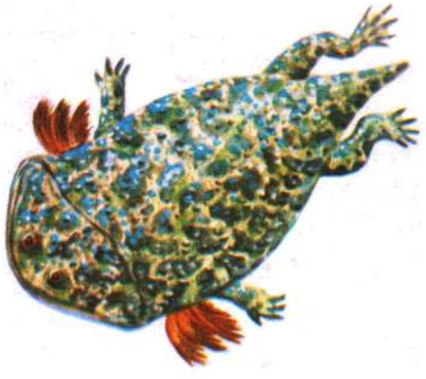
The predatory INOSTRANCEVIA warmed itself as it moved. It would run over the rocks, circle through the weeds near the water, hoping to come across a herd of clumsy plump-cheeked reptiles PARIASAURI.

The slow Pariasaurus seemed very terrible in appearance but actually was quite defenceless. It could not escape a quick flesh-eater on its short and crooked paws. But the paws were very useful for digging into the peat. This reptile the size of a cow would bury itself in mud, then the sharp-toothed Inostrancevia would be unable to find it.



The Diplocaulus Stegocephalian looked like a ship anchor

A small Stegocephalian, the Branchiosaurus, liked insects, lived in marshes and almost never came out on dry land



A flat Stegocephalian resembling an air mattress, the Plagiosaurus, lay in wait for prey on the bottom, its red gills spread out. It never climbed out of the water

FROGS GALORE

300 Million Years Ago

The forest was soaked by water like a sponge.

Little streams of water ran down the scaled tree trunks and dropped from the luxurious featherlike branches. A rose-coloured mist drifted in the air.

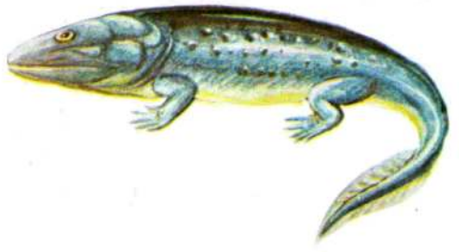
Some trees were waist deep in water, others tried to make their way out of the water on roots resembling stilts. It was a strange forest with strange trees. As if a magician had made a swamp hillock and its inhabitants a thousand times larger than they are.

The horsetail of the swamp grew higher than birch trees. The club moss now hardly discernible in the grass rose like century-old pine trees. A giant dragonfly, its metre-long wings whirling like a copter's, descended to the water. A frog the size of a calf put its head out of the water and the forest shook from the resounding croaking. The warm, heavy drops poured on the heads of the innumerable great-grandmothers of today's frogs and tritons,which swam, crawled and warmed themselves in the sun in the forest of the Early Life.

All these frog relatives are called STEGOCEPHALIA by scientists. Many of the Stegocephalia had three eyes.

A Stegocephalian would be warming itself in the sun. One eye was asleep, so was another, but the third one,on the crown, was not, it was on guard. As soon as an unfamiliar shadow would appear, the Stegocephalian would dive into the deep water with a splash.

The Crossopterygius fish was the first creature to come out on dry land



The Ichthyostega was no longer a fish but still not a Stegocephalian

The Lethoverpethon Stegocephalian was among the first to come out on dry land

LIFE APPEARS ON LAND

400 Million Years Ago

This page tells about one of the most important events on earth. At the very beginning of Early Life, the earth was a grim and silent desert. No one ran or crept across it. Only spots of lichen stood out in red against the dark rocks. Life hid in the sea from the merciless rays of the sun.

The algae were the first to come out of the water. The ocean surf carried them out on shore for billions of years. Some algae grew accustomed to light and air, and remained to live on dry land. It was to these coastal weeds that the daring pioneers headed. They were all very small: scorpions, shell spiders, shell ticks and centipedes. They had many enemies in the sea and only two on dry land—the hot sun and dry air. That was why the first inhabitants of dry land were afraid of going far from sea and wore a protective shell.

They were followed by the CROSSOPTERYGII. The latter fish had fleshy flippers-legs. Besides gills, they had lungs so as to breathe both in the water and on land.

The pioneers went further and further from their native seas. Along the way, the centipedes turned into insects, the Crossopterygii developed into frogs, reptiles, birds and animals.

THE UNDERWATER GARDENS

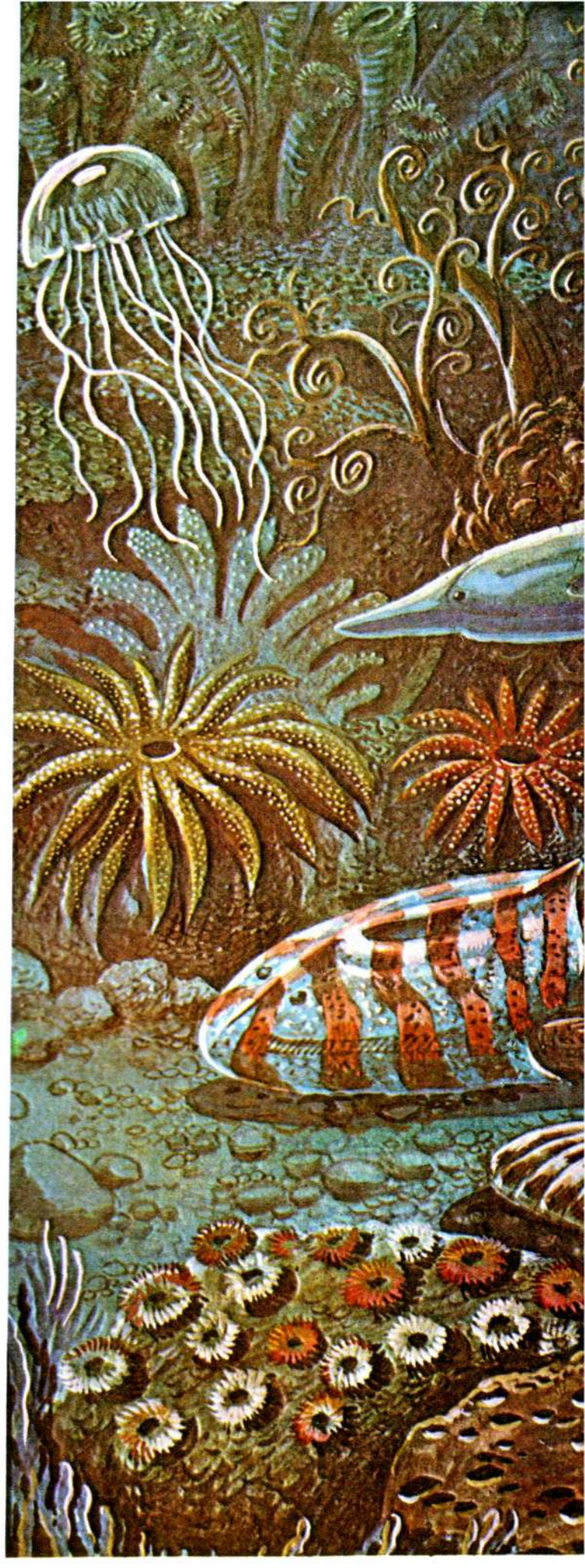
430 Million Years Ago

It was silent in the sunny underwater gardens. The green, red and blue stalks of the SEA LILIES rose from the bottom like trees in bloom. Different-coloured buds of BLASTOIDS and ripe apples of CYSTOIDS rocked between them on the mud bottom. All of these were animals related to the sea urchins and starfish.

Wondrous fish swam out of the "thicket" of sea lilies. Today, no one would ever call them fish. One of these fish was in a hard shell and only the tail moved, others were quicker and stang any enemy with electric current. Each fish protected itself from enemies in its own way.

A grove of small silvery trees was not far. Surprising as it may seem, these were carnivores, distant relatives of the corals now living in the warm seas.

All of a sudden, the water was stirred up, the mud rose up like a pillar. The buds and apples were swept to different sides. It was the bandit of the seas, the CRAWFISH-SCORPION attacking a slow fish; it instantly disappeared with its prey in its pincers. The water grew still again, the mud settled on the bottom. Silence once again set in in the underwater garden.



The large jellyfish were almost the same as today

The shell octopus was a relative of the modern octopus and wood-louse

The Trilobite was a distant relative of the crab. There were large and small Trilobites; some totally blind, some with eyes on long stems

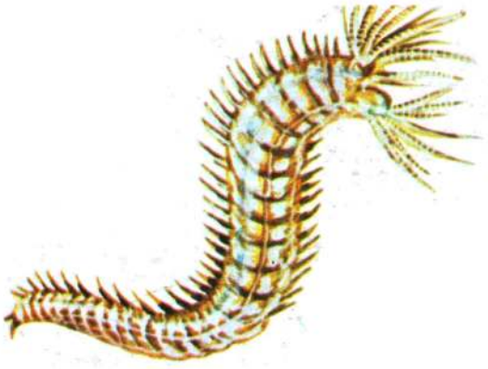
THE SEA WITHOUT FISH

550 Million Years Ago

The sea was churning and boiling.

The clutching tentacles and strong beak were attempting to catch hold of a large scale-covered ball. This was the SHELL OCTOPUS, master of the ancient sea, fighting a big TRILOBITE, a creature resembling a large wood-louse. The Trilobite would never have attacked the octopus, because it preferred much smaller game. There was no hope of crushing the long hard shell, coping with the mighty tentacles or withstanding the merciless beak. But the Trilobite failed to escape in time and burrow into the mud and was forced to defend itself. How could it defend itself if it had a soft tummy? Only by curling up into a ball and confronting the enemy with its armoured back. The octopus tried to overcome the Trilobite in different ways. But to no avail. The Trilobite proved to be too big for it. When the octopus was tired out and its tentacles let go, the Trilobite slipped into the mud, turned around and burrowed into it. Try and find it! The octopus looked round, moved about and swam away.

Silence set in again. Only the jellyfish rocked slightly at the surface while the starfish crawled along the bottom between still shapes of ancient sponges and the beautiful actinias.



It could move by itself

The first green plants were the tiniest algae

A transparent, jellylike but already living drop

THE AGE OF PRIMORDIAL LIFE

570 to 3.200 Million Years Ago

The age of Primordial Life was the longest and most mysterious in the history of living creatures. The earth looked grim and forbidding in those distant times. Powerful volcanoes thundered here and there, and streams of hot lava came pouring out of cracks in the ground and flowed over the bare endless desert. But life had already appeared in the warm and not salty waters of the ocean. Innumerable flocks of transparent jellylike drops swam at the very surface in the sunlight. These drops were so small one could see them only under a microscope. The waves carried them out on shore, and the current swept them into the silent depth of the ocean. The drops perished in the billions. But life never remained still. Billions of years passed, and the clots changed mysteriously. Some of them merged and formed organisms which did not resemble each other. Of these, some preferred a calm life descending to the bottom and implanting themselves in it. Plants developed from these. Others remained sea roamers. Others grew themselves a hard shell as a home and became mollusks. Still others learned to move quickly. This proved to be very important for them. They ceased to be toys in the hands of the waves, could fight the current and catch their prey. It was from these that eventually all the animals which lived and now live on earth originated.

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И. Яковлева

ПАЛЕОНТОЛОГИЯ В КАРТИНКАХ

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